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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/579,191

08/02/2006

Tadashi Komoto

2006_0721A

6698

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7590

06/18/2009

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EXAMINER

DYE, ROBERT C

ART UNIT

PAPER NUMBER

1791

MAIL DATE

DELIVERY MODE

06/18/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/579,191	Applicant(s) KOMOTO ET AL.	
	Examiner ROBERT DYE	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29-31, 33-38 and 41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 29-31 and 33-38 and 41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Final Office Action is in response to Applicant's reply, dated 3/16/2009, to a Non-Final Office Action. Claims 29-31 and 33-38 have been amended, claims 21-28, 32, 39 and 40 cancelled, and claim 41 newly added. Claims 29-31 and 33-41 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 29-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 29 recites the limitation "the insert member" in line 9. There is insufficient antecedent basis for this limitation in the claim. It is assumed that the "insert member" is referring to the "metal gear" as similar to claim 41.

5. Claims 30-41 are rejected for being dependent upon rejected claim 29.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 29-31 and 34-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP2002-248649 (Foreign Patent Publication and partial translation, already of record) in view JP1-310924 (Foreign Patent Publication and partial translation, already of record), JP1-69314 (Foreign Patent Publication and partial translation, already of record), JP 7-60556 (Foreign Patent Publication and partial translation, already of record) and Kasai et al. (USP 5,109,052).

10. Regarding claim 29, JP2002-248649 (hereinafter '649) teaches a method of manufacturing a resin-coated metal gear comprising a step of pre-heating mold above

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40°C (mold temperature: 80°C, paragraph 16), a step of injection molding the resin onto the insert, and a cooling step. '649 does not explicitly state a holding step; however, such a step would inherently take place in the injection molding operation of '649. Any miniscule passage of time between injection of the resin and removal of the product would constitute a holding step.

11. Document '649 does not teach a step wherein the insert is preheated. In the same field of endeavor of insert molding, JP1-310924 (hereinafter '924) teaches a method wherein a metal or ceramic insert is preheated before insertion into the die in order to prevent peeling of the applied resin (see Table 1 and examples 1, 2, and 4). Document '924 discloses the use of a pre-heated mold and insert within the claimed ranges (mold temperature of 150C, pg 2, line 10; nozzle temperature for resin is 390C for examples 1 and 2, 290C for example 4, Table 1 lists the insert part's temperature at time of injection and notes that no peeling occurs unlike the comparative examples wherein no-preheating is carried out). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to preheat the metal gears as taught by '924 in the method disclosed in '649 for the benefit improving the adhesive properties of the resin to the insert by preventing the occurrence of peeling (Table 1 and example 1).

12. The hypothetical combination of '649 and '924 still does not teach a step wherein the insert is removed from the die and then gradually cooled; however, in the same field of endeavor of injection molding articles, JP1-69314 (hereinafter '314) teaches a method wherein an injection molded article is slowly cooled following injection for the

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purpose of achieving constant shrinkage and eliminating problems of inner strain or dimensional scattering due to quenching (pg 5 of partial translation). Thus, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have slowly cooled the molded article as taught by '314 in the method of the combination '649 and '924 for the purpose of achieving constant shrinkage and reduced inner strain (pg 5).

13. The hypothetical combination of '649, '924 and '314 still does not teach a step wherein the insert material is subjected to a shot-blasting treatment and a silane coupling treatment. In the same field of endeavor of manufacturing insert parts with synthetic resin coverings, '556 teaches a method wherein a shot blast and silane-coupling treatment are applied to the metal surface for the purpose of increasing the bonding strength between the metal insert and the synthetic resin (paragraphs 44-45). Thus, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to perform a shot blast and silane-coupling treatment as taught by '556 in the method of combination of '649, '924 and '314 for the purpose of increasing the bonding strength of the applied resin to the insert (paragraphs 44-45).

14. Regarding the type of resin employed in coating of the metal gears, '649 discloses the use of nylon 66, an aliphatic polyamide, as the resin. '649 does not teach a method wherein the resin comprises a polymer alloy in which a polyphenylene phase is dispersed in a matrix phase of an aliphatic polyamide. Kasai et al. teaches that while polyamide resins have excellent mechanical strength and resistances, they are inferior to other plastics with respect to dimensional stability, insusceptibility to moisture

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absorption, heat distortion resistance, and impact resistance in the dry state (col 1, lines 35-43). Kasai further teaches that blending with polyphenylene ether resins has been attempted to attain effective utilization of desired properties inherent in both the polyamide and PPE resins (col 1, lines 52-55). Kasai et al. (hereinafter Kasai) discloses a thermoplastic resin composition which is described as a polyphenylene ether dispersed in a continuous (matrix) phase of a polyamide (abstract; nylon used as polyamide, col 5, lines 45-46). Said resin has an excellent balance of thermal stability, heat distortion resistance, impact resistance, oil resistance, and stiffness, etc., and, hence, is useful as an engineering material (abstract, Kasai notes that it is useful in the field of automobiles; '649 discloses a resin coated worm gear for an automobile). It would have been obvious to a person having ordinary skill in the art at the time of the invention to employ a copolymer of polypenylene ether and polyamide as taught by Kasai in the method of '649, '924, '314, and '556 for the purpose of employing a resin with a balance of stability, strength and resistance.

15. Regarding claim 30, '649 teaches the method for making an insert-containing resin gear such as a worm wheel (paragraph 1). Such a wheel is used for transmitting power.

16. Regarding claim 31, '649 teaches that the gear is made of iron (paragraph 16).

17. Regarding claim 34, wherein the resin-coated metal gears have suppressed resin crack and resin peeling, the examiner notes that the steps taught and discussed above would result in such properties.

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18. Regarding claims 35 and 36, the matter of whether the gears that have been coated with a resin intermesh with gears that have been coated with a resin or not is merely one of design and as such can be configured in an appropriate matter by a person having ordinary skill in the art.

19. Regarding claims 37 and 38, wherein the resin-coated metal gears obtained by the method of claim 29 have impact resistance and fatigue resistance superior to that of a resin-made gear, the cited combination of prior art teaches the method of claim 29 as described above and the properties of increased impact and fatigue resistance would be expected to be inherent as a result of applying a resin coating to a metal gear in a manner as described in the claimed method.

20. Regarding claim 41, the preheating temperatures of the insert and mold as taught by '924 and discussed above for claim 29 falls within the claimed ranges (mold temperature of 150C, pg 2, line 10; nozzle temperature for resin is 390C for examples 1 and 2, 290C for example 4, Table 1 lists the insert part's temperature at time of injection and notes that no peeling occurs unlike the comparative examples wherein no-preheating is carried out).

21. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP2002-248649 (partial translation, already of record) in view of JP1-310924 (partial translation, already of record), JP1-69314 (partial translation, already of record), JP 7-60556 (partial translation, already of record) and Kasai et al. (USP 5,109,052) as applied to claim 29 above, and further in view of Kitahata et al. (PG Pub 2003/0013475).

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22. The previously stated combination of '649, '924 '314, '556 and Kasai teaches a method of making a resin-coated gear as described above for claim 28, but does not teach a method wherein the resin applied to the surface of the insert member has a thickness in a range of 5µm to 30mm. In the same field of endeavor or making resin coated articles, Kitahata et al. (hereinafter Kitahata) teaches a resin coated gear wherein the thin resin layer has a thickness set between 100um to 250um for the purpose of achieving reduced working noise and wear (paragraph 35). It would have been an obvious for a person having ordinary skill in the art at the time the invention was made to use the thickness as taught by Kitahata in the aforementioned combination for the purpose of ensuring a sufficiently thick coating on the surface of the gears to achieve noise and wear reduction (paragraph 35).

Response to Arguments

23. Applicant's arguments filed 3/16/2009 have been fully considered but they are not persuasive. Applicant's arguments can be summarized as follows:

- a. The claims have been amended to recite a resin comprising a polymer alloy of polyphenylene and polyamide. The cited prior art fails to teach this claimed feature.
- b. The cited prior art fails to teach the preheating of the insert and mold to within the claimed temperature range.

24. Applicant's arguments with respect to PPE/PA alloy resin have been considered but are moot in view of the new ground(s) of rejection.

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25. Regarding applicant's arguments with respect to the preheating of the insert and mold, the Examiner wishes to point out that the previously cited prior art of JP1-310924 teaches the preheating of an insert and mold to temperatures within the claimed ranges in order to prevent peeling of the resin from a metal or ceramic insert (see Table 1 and examples 1, 2, and 4). Document '924 discloses the use of a pre-heated mold and insert within the claimed ranges (mold temperature of 150C, pg 2, line 10; nozzle temperature for resin is 390C for examples 1 and 2, 290C for example 4, Table 1 lists the insert part's temperature at time of injection and notes that no peeling occurs unlike the comparative examples wherein no-preheating is carried out).

Conclusion

26. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT DYE whose telephone number is (571)270-7059. The examiner can normally be reached on Monday to Friday 8:00AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph S. Del Sole can be reached on (571)272-1130. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RCD

/Joseph S. Del Sole/
Supervisory Patent Examiner, Art Unit 1791